If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match.
The on-screen version of the Collider-Accelerator Department Procedure is the Official Version.
Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.

C-A OPERATIONS PROCEDURES MANUAL

2.6 Lockout/Tagout Procedure for Personnel Entry into the AGS or BOOSTER Ring

Text Pages 2 through 7

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Collider-Accelerator Department Chairman Date

P. Ingrassia

2.6 Lockout Tagout Procedure for Personnel Entry into the AGS or Booster Ring

1. Purpose

1.1 This procedure provides instructions to personnel entering the AGS and/or Booster Accelerator Rings, during particle beam operations or during shutdown periods, under Controlled or Restricted Access conditions, with the assurance that electrical hazards have been secured or are properly barriered.

1.2 C-A Policy states that the preferred method to protect workers from energy sources is Lockout/Tagout (LOTO). Alternate means may be employed when the work cannot be performed any other way.

> **Note**:
> This procedure is to be applied only to the AGS and Booster Rings.

1.2.1 The term Controlled Access, as used for the Access Control Radiation Safety system, denotes a state of a primary beam enclosure, whereby trained personnel are allowed access via only one portal and their ingress and egress is recorded by a gate watch-stander.

1.2.2 The term Restricted Access, as used for the Access Control Radiation Safety system, denotes the state of a primary beam enclosure, whereby trained personnel are allowed access through all portals without logging in or out.

2. Responsibilities

2.1 Responsibilities of the Operations Coordinators

2.1.1 The Operations Coordinator (OC), the Head of the Main Control Room (MCR) Group, or the Deputy Accelerator Division Head shall inform the MCR Operators whether access to the accelerator is to be placed in the "Controlled" or "Restricted" Access state, and to LOTO electrical apparatus to provide the appropriate level of safety for workers inside the ring enclosures.

2.2 Responsibilities of the MCR Operators

2.2.1 MCR Operators shall perform Group LOTO for the AGS and/or Booster Rings.

2.3 Responsibilities of other workers

2.3.1 Personnel, including MCR Operators, entering an accelerator ring shall observe that the TOKEN is in the TOKEN Box and to ensure their own safety apply their lock, as required, to the TOKEN Box.

2.4 System Specialist shall:

2.4.1 Erect appropriate barriers before requesting removal of LOTO in order to test apparatus, and

2.4.2 inform the OC when work is complete so that the apparatus can be placed in LOTO.

3. Prerequisites

3.1 To assure electrical safety, the various sources of electrical hazards, range B, C and D as defined in reference 7.1, shall be appropriately barriered, or shall be opened, locked, and tagged out by the MCR Operators. For different states of accelerator access, i.e. Controlled or Restricted, the list of energy control devices to be opened, locked and tagged, can be found in C-A OPM 2.6.1.

3.1.1 The following systems have been reviewed and are properly barriered, or are in a range A category as defined in reference 7.1:

3.1.1.1 Vacuum systems: all vacuum pumps and gauges,

3.1.1.2 Ring general services: i.e., 120 V, 208 V, 480 V power receptacles, fire detection and protection equipment, lighting and ventilation equipment.

3.2 Prerequisites of importance for all workers.

3.2.1 When entering the AGS or Booster Ring, entrants who only observe or advise other workers, and not work on apparatus attached to the main magnet supports or connected to the vacuum chamber shall have :

- valid C-A Access Training or an escort on Permit "G",
- 256 key or an escort on Permit "G",
- a valid TLD and Alarming dosimeter

3.2.2 When entering the AGS or Booster Ring entrants, who work on apparatus attached to the main magnet supports or connected to the vacuum chamber, shall in addition to 3.2.1 have :

- Electrical Safety and LOTO Training valid,
- C-A issued safety lock,

3.2.2.1 When some apparatus remains energized and the apparatus is barriered,

3.2.2.1.1 the OC shall issue Energized Circuit Work Permits (see C-A OPM 2.6.2) to ring entrants.

3.2.2.1.2 each ring entrant shall:

- apply a lock to the TOKEN Box, and
- carry an Energized Circuit Work Permit.

3.2.2.2 When only the Main Magnet Power Supply has been locked and tagged, each ring entrant shall:

- apply a lock and tag to the TOKEN Box,
- carry an Energized Circuit Work Permit, and
- have Working Hot valid

3.2.2.3 When the Main Magnet Power Supply has NOT been locked and tagged, each ring entrant shall:

- have additional training in the tasks specified in the range D Working Hot Permit,
- Have Working Hot valid,
- apply a lock onto the TOKEN Box, and
- carry a specific Range D Working Hot Permit.

3.3 Prerequisites for System Specialists:

3.3.1 Each System Specialist shall obtain OC approval (or from the Maintenance Coordinator (MC), when on maintenance) to energize apparatus for testing when the AGS or Booster rings are in controlled or restricted access conditions.

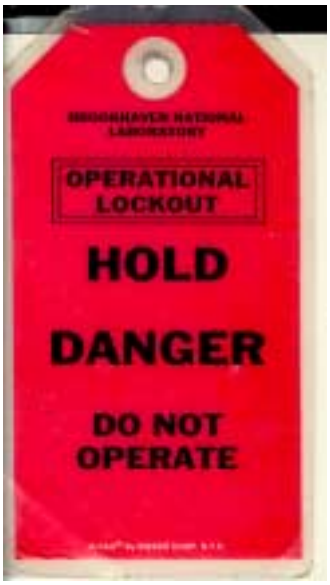
4. Precautions

4.1 Under Controlled Access Conditions only one ring gate may be opened at a time.

4.2 MCR personnel who enter an accelerator ring are subject to the requirements of workers as described in this procedure.

4.3 The matching accelerator ring TOKEN must be in the appropriate accelerator TOKEN Box, e.g. Booster TOKEN in the BOOSTER TOKEN Box and the AGS TOKEN in the AGS TOKEN Box.

4.4 The TOKEN Box shall be locked and tagged out by the Responsible Authorized Person (RAP), the C-A Work Coordinator, or the MCR Group Leader, or designee, depending on the status of the Accelerator. The TOKEN shall consist of the key from the appropriate accelerator ring lock box. A sample of the tag used is shown below.



4.5 Precautions of interest to other workers

4.5.1 Upon encountering a safety barrier in the accelerator enclosure, personnel shall not:

- cross under or enter the barriered area,
- walk on or behind the main magnet girders.

Note:
If access to continue around the Ring is prevented by a barrier, return to the MCR and inform the OC who shall determine an alternate course of action.

5. Procedure

5.1 All personnel entering an accelerator ring enclosure shall:

5.1.1 Confirm that the TOKEN Box contains the TOKEN and that it is locked and tagged out.

5.1.2 Apply their lock to the key multiplier on the TOKEN Box.

5.1.3 Apply a separate lock (as required) to each TOKEN BOX if entry to both accelerator rings is required during the same period,

Note:
The AGS TOKEN Box is located at the AGS Ring South Gate.
The BOOSTER TOKEN Box is located in building 914 next to the "Mangate".

5.2 Workers shall remove their locks from the TOKEN Box at the completion of the maintenance task.

5.3 When in Restricted Access, all personnel shall exit the ring whenever an announcement is made to do so, and remove their locks from the TOKEN Box.

5.4 System Specialist shall:

5.4.1 Obtain approval to energize apparatus from the Maintenance Coordinator.

5.4.2 Install barriers around equipment and report same to the OC.

5.4.3 Request from the OC that LOTO be removed for apparatus to be tested.

5.4.4 Remove the barriers when testing is completed AFTER the apparatus has been LOTO by the operators.

6. Documentation

None.

7. References

7.1 BNL ES&H Standard section 1.5.0 & 1.5.1

7.2 C-A-OPM 2.6.1, "Lockout/Tagout for Booster MMPS"

7.3 C-A-OPM 2.6.2, "Procedure for Partial Lockout for the AGS and Booster Rings, During Accelerator Operations, Under Controlled Access Conditions."

7.4 C-A-OPM 2.6.3, "Procedure for Lockout/Tagout for the Booster MMPS".

7.5 Lockout/Tagout Training

8. Attachments

None